Consumer and Corporate Affairs Canada | Consommation et Corporations Canada

(11) (A) No. 1 266 261

(45) ISSUED 900227

(52) CLASS 241-123

(51) INT. CL. ^{4} B02C 13/28

(19) (CA) **CANADIAN PATENT** (12)

(54) Mineral Breaker

(72) Potts, Alan,
U.K.

(73) Granted to MMD Design & Consultancy Limited
U.K.

(21) APPLICATION No. 501,298

(22) FILED 860206

(30) PRIORITY DATE (GB) U.K. (8502961) 850206
(GB) U.K. (8519516) 850802

No. OF CLAIMS 9

Canada

DISTRIBUTED BY THE PATENT OFFICE, OTTAWA.
CCA-274 (11-82)

ABSTRACT

~~TOOTH CONSTRUCTION FOR A~~ MINERAL BREAKER

A mineral breaker including at least one breaker drum carrying a plurality of breaker teeth projecting radially therefrom, at least one breaker tooth comprising a tooth core projecting radially outwardly of the drum and having leading and trailing faces, an open sided tooth sheath including a leading wall and a trailing wall connected to one another at one end by a connecting wall which forms the terminal end of the tooth, the inner surfaces of the leading and trailing walls of the tooth sheath having flat faces which abut against opposed flat faces on the tooth core.

MINERAL BREAKER

The present invention relates to a mineral breaker.

In a mineral breaker of the type disclosed in our European Patent Application No. 83900287.0 (Publication No. 0096706) a breaker drum is provided having a series of radially projecting teeth spaced both circumferentially and axially along the drum.

It is highly desireably to construct the teeth so as to have a core of impact resistant material and a tooth sheath enveloping the core, the sheath being made of a wear resistant material such as high manganese content steel.

Under working conditions loadings placed on the tooth sheath are transmitted to the core to be absorbed. Ideally the fit between the sheath and core should be an accurate one so that relative movement therebetween is not experienced during impacts on the teeth when hitting the mineral to be broken. If movememnt is allowed 'chattering' of the sheaths on their respective cores occurs which progressively becomes worse as wear takes place between the core and covering sheath.

The tendency of chattering to occur increases with an increase in the height of tooth and so the larger the design of tooth the greater the need to ensure a close fit between the tooth sheath and its supporting core.

It is a general aim of the present invention to provide a tooth construction for a mineral breakerof the type disclosed in European Patent Publication 0096706 wherein the tooth construction includes a core having a sheath mounted thereon which is a close and accurate fit.

A

According to one aspect of the present invention there is provided for a mineral breaker having at least one breaker drum including a plurality of breaker teeth projecting radially from the drum and further including a plurality of opposed breaker teeth positioned so that, on rotation of the drum, mineral lumps to be broken are gripped between the leading faces of the teeth on the drum and said opposed teeth to thereby break the mineral lumps gripped therebetween by a snapping action, the improvement of each breaker tooth on said drum comprising: a tooth core projecting radially outwardly of the drum and having circumferentially directed flat leading and trailing faces; an open sided tooth sheath seated on the core to cover said leading and trailing faces of that core, the tooth sheath comprising a leading wall and a trailing wall connected to one another only at one end by a connecting wall which forms a terminal end of the tooth, the inner surfaces of the leading wall and the inner surfaces of the trailing wall of the tooth sheath having flat faces which abut against opposed flat faces on the tooth core; and fastening means for deflecting the leadings and trailing walls of the tooth sheath inwardly to clamp the flat faces of the tooth sheath into abutment with the opposed flat faces on the tooth core.

Accordingly, since the tooth sheath is open sided it is possible to gain access to the inside faces of the sheath to machine them as desired to cater for tolerances and flaws occuring during casting of the tooth sheaths. In addition, since the leading and trailing walls of the tooth sheath are

connected at one end by the connecting wall, it is possible for the leading and trialing walls to flex slightly. This is advantageous since when through bolts are used passing through the leading and trailing walls, the walls can be deflected inwardly by tightening of the bolts to bring the mating flat faces of the tooth core and sheath into close contact should there be slight clearance therebetween prior to insertion of the bolts.

Various aspects of the present invention are hereinafter described with reference to the accompanying drawings, in which:-

Figure 1 is a side view of a multi-toothed ring assembly for use in constructing a mineral breaker drum;

Figure 2 is an end view of the ring assembly shown in Figure 1; and

Figure 3 is an end view of a modified ring assembly.

In the drawings there is shown a ring assembly 10 having an internally splined bore 11 for receiving a splined drive shaft (not shown). In use, a plurality of ring assemblies 10 are mounted side by side on a common shaft to define a breaker drum for a miineral breaker. See for instance our European Application No.

83900287.0 (Publication No. 0096706).

The ring assembly 10 includes an annular portion 14 from which projects four tooth cores 18. The annular portion 14 and tooth cores 18 are preferably formed in one piece by casting a suitable steel. Each tooth core 18 is formed so as to have a planar leading or front face 20 and a planar trailing or rear face 22. These faces are preferably finished by grinding to achieve accurate predetermined dimensions therebetween. Preferably the faces 20, 22 are parallel.

Each tooth core 18 is provided with a tooth sheath 28 to form a tooth construction for breaking mineral. Each tooth sheath 28 is preferably formed of a hard wearing abrasive resistant material such as a high manganese content steel. Each tooth sheath 28 is formed by casting and comprises a leading wall portion 30, a trailing wall portion 31 and an upper connecting wall portion 32 which extends between the leading and trailing wall portions and in use defines the tip or terminal end of the tooth. The sheath 28 is open sided to define openings 34 on both sides (only one opening being visible). The opposed inner faces 36, 38 of the leading and trailing wall portions are planar and in use abut against the planar faces 20, 22 of the tooth core. The openings 34 provide access to the opposed inner faces 36, 38 of the leading and trailing wall portions respectively to enable finishing operations, such as grinding, to be performed on these faces to thereby enable an accurate fit to be achieved.

Bolt bores 40 are provided which extend through the leading and trailing wall portions of the sheath and associated core. Bolts (not shown) pass through the bores 40 and serve to hold the sheath on its associated core. Since the leading and trailing wall portions are connected to one another at one end only, they are able to flex by an amount determined by the material from which they

are made and the dimensions of the wall portions. Accordingly on tightening of the bolts, the wall portions are urged inwardly and it is thereby ensured that the inner faces 36, 38 are effectively clamped into engagement with mating faces 20, 22 respectively formed on the core.

The width of the leading wall portion, upper wall portion and trailing wall portion are preferably chosen so as to cover the leading face, terminal end face and trailing face of its associated tooth core.

As seen more clearly in Figure 2, the exposed faces of the tooth sheath may be shaped to provide an optimum working profile, in the illustrated embodiment these faces are shaped to define a central raised portion.

In the embodiment of Figures 1 and 2, the bolts also serve to restrain lateral and radial movement of the sheath relative to the core.

In the embodiment of Figure 3 a tongue 50 is provided which is located centrally of the core and which extends along its leading face 20 along its terminal end face 21 and along its trailing face 22.

The tooth sheath 28 is provided with a complementary groove for receiving the tongue and the tongue and groove co-operate to restrain lateral movement of the tooth sheath relative to the core. The depth of the groove is preferably the same as or slightly greater than the height of the tongue so that opposed planar faces of the core and leading and trailing wall portions located on both sides of the tongue and groove arrangement are brought into mutual abutment after tightening of the bolts.

If desired, the tongue 50 may extend along either the leading face or the trailing face or the terminal end face only or along any combination of these faces.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a mineral breaker having at least one breaker drum including a plurality of breaker teeth projecting radially from the drum and further including a plurality of opposed breaker teeth positioned so that, on rotation of the drum, mineral lumps to be broken are gripped between the leading faces of the teeth on the drum and said opposed teeth to thereby break the mineral lumps gripped therebetween by a snapping action, the improvement of each breaker tooth on said drum comprising:

(a) a tooth core projecting radially outwardly of the drum and having circumferentially directed flat leading and trailing faces;

(b) an open sided tooth sheath seated on the core to cover said leading and trailing faces of that core, the tooth sheath comprising a leading wall and a trailing wall connected to one another only at one end by a connecting wall which forms a terminal end of the tooth, the inner surfaces of the leading wall and the inner surfaces of the trailing wall of the tooth sheath having flat faces which abut against opposed flat faces on the tooth core; and

(c) fastening means for deflecting the leading and trailing walls of the tooth sheath inwardly to clamp the flat faces of the tooth sheath into abutment with the opposed flat faces on the tooth core.

A

2. A mineral breaker according to Claim 1 wherein the tooth core and tooth sheath are provided with co-operating formations for restraining relative movememnt between the tooth core and the tooth sheath in an axial direction of the drum.

3. A mineral breaker according to Claim 1 wherein the co-operating formations include a tongue formation on the core.

4. A mineral breaker according to Claim 3 wherein the tongue extends along at least one of the leading, trailing or terminal end faces of the core.

5. A mineral breaker according to Claim 1 wherein the fastening means comprises at least one bolt which passes through the leading and trailing walls of the tooth sheath and into the tooth core.

6. A mineral breaker according to Claim 5 wherein each bolt extends through the leading wall of the tooth sheath through the tooth core and through the trailing wall.

7. A mineral breaker according to Claim 1 wherein the breaker drum includes a plurality of ring assemblies mounted side by side on a shaft, each ring assembly having an annular portion and projecting therefrom a plurality of said cores spaced about its circumference.

A

8. A mineral breaker according to Claim 7 wherein the annular portion and cores are formed as one piece.

9. A mineral breaker according to Claim 1 wherein the sheath is cast from a high manganese content steel.

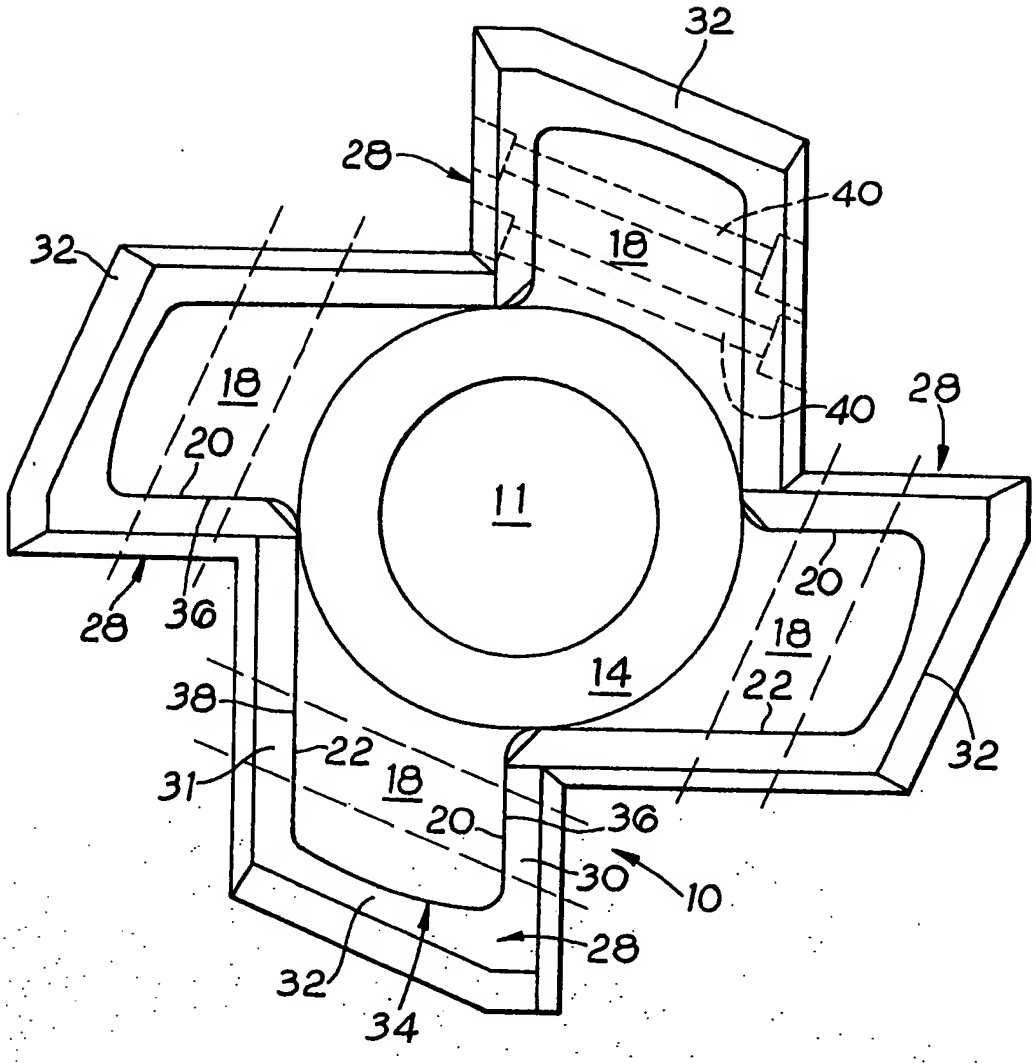

Fig.1

ALAN POTTS
INVENTOR

Patent Agents

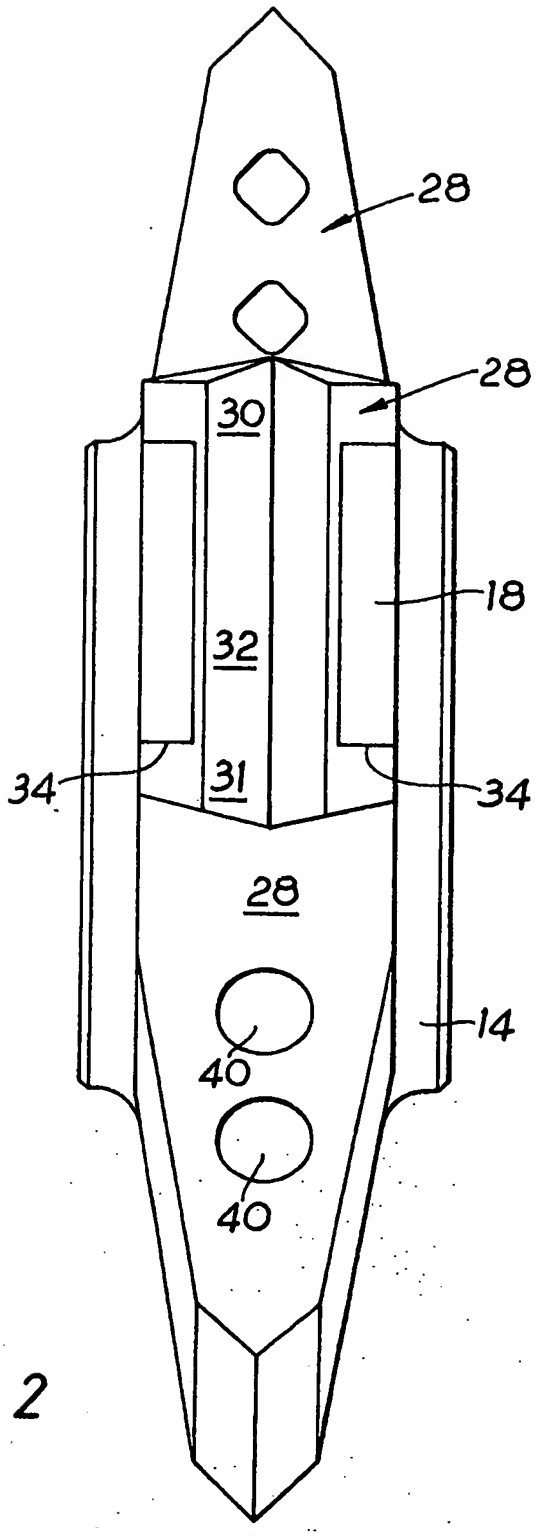

Fig. 2

ALAN POTTS
INVENTOR
Wotell & Hanley
Patent Agents

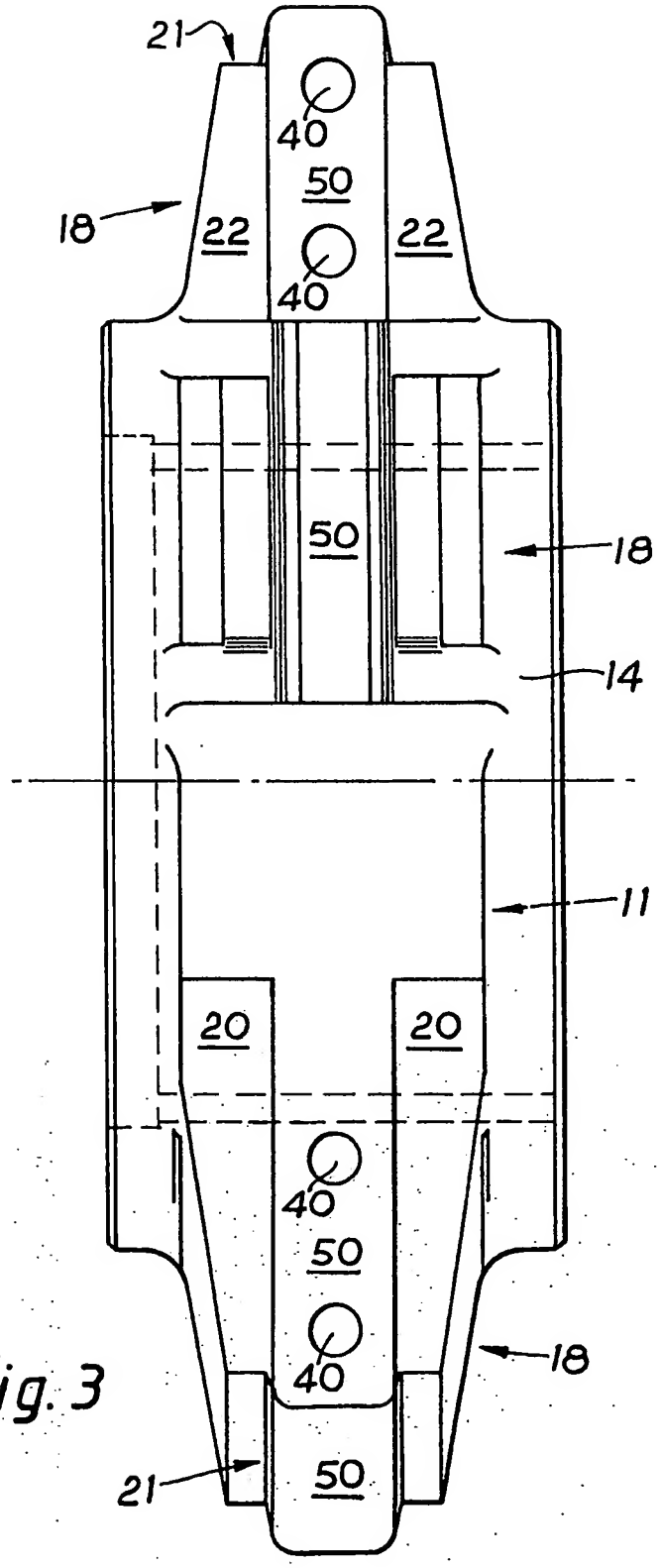

Fig. 3

ALAN POTTS
INVENTOR
Patent Agents